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(54) Title: CREATINE CONTAINING CARAMEL

(57) Abstract: The present invention provides a creatine containing caramel composition which increases the efficiency of a creatine dose. Particularly, micronized creatine is uniformly dispersed in a caramel composition having an insulin response enhancing amount of an invert sugar. The average particle size of micronized creatine is smaller than about 200 mesh. Such a size enables the gastrointestinal tract to absorb a greater percentage of the creatine than normally sized creatine. Additionally, the reduced particle size works in conjunction with the insulin response provoked by the sugar to allow the greater absorption of creatine by the muscle cells. Additionally, the present invention presents a method of reducing or eliminating a bitter taste caused by micronized creatine. Particularly, the micronized creatine is uniformly dispersed in a caramel composition containing a sufficient amount of invert sugar to reduce or eliminate any bitter taste or after taste.

CREATINE CONTAINING CARAMEL

The Field of the Invention

The present invention relates generally to a composition and method for administering creatine. More particularly, it concerns a creatine containing caramel.

BACKGROUND OF THE INVENTION

Creatine is a substance which has become popular for use as a dietary supplement, particularly in the area of sports nutrition. Having the general chemical formula $C_4H_9O_2N_3$, creatine is a substance found mainly in the muscle tissues of the body. In the muscle tissue creatine serves several functions which are directly related to muscle condition and performance. Particularly, creatine serves to increase the amount of energy available for use by a muscle, and facilitates stress induced muscle growth.

Muscle contraction and relaxation are fueled by energy liberated during the dephosphorylation of adenosinetriphosphate (ATP). The ATP stored within a cell is rapidly depleted during normal physical activity. For tissue function to continue, ATP must be continuously resynthesized from its breakdown products, one of which is adenosinediphosphate (ADP). Creatine is useful in increasing the energy available to a muscle because of its ability to weakly bond to phosphorus ions and form creatine phosphate (phosphocreatine). This weak bonding allows quick and easy liberation of the phosphorus for use in ATP resynthesis.

During maximal exercise of a short duration, ATP resynthesis is accomplished almost exclusively by the anaerobic degradation of phosphocreatine (PCR) and glycogen. Hultman E. et al., Energy metabolism and fatigue; Taylor A. et al., eds. Biochemistry of exercise VII, Champaign, IL, Human Kinetic Publishers, 1990: vol. 21, 73-92. It has also been proposed that the observed decline in force production during intense muscle contraction may be related to the availability of muscle PCR stores. Greenhaff P. L. et al., Influence of oral creatine supplementation of muscle torque during repeated bouts of maximal voluntary exercise in man, *Clinical Science* (1993) 84, 565-571. The depletion of these PCR stores limits the rephosphorylation of ADP, thereby limiting the ATP

available for energy production. Therefore, the amount of creatine available for use in the muscles has become a key factor in maximizing athletic performance.

In addition to the energy providing functions detailed above, creatine aids in muscle building as a cortisol blocker. Cortisol, also known as hydrocortisone, is a naturally occurring anti-inflammatory steroid. Cortisols and other catabolic hormones, such as prostaglandin-E_2, and adrenocorticotropin (ACTH), are produced by the body as a response to trauma. Intense physical exercise is recognized by the body as a form of trauma and facilitates the release of catabolic hormones.

As a catabolic hormone, cortisol has two specific detrimental effects on muscle tissue. First, cortisol facilitates the release of amino acids from muscle tissue and prevents the absorption of glucose. Second, cortisol cannibalizes muscle tissue. While these two effects are a tolerable trade for the anti-inflammatory results of cortisol on a short term intermittent basis, the result of continually elevated cortisol levels is detrimental to the building of muscle tissue.

In order to achieve and maintain peak performance, athletic training is normally a long term continual process. Since such training is recognized by the body as trauma, cortisol levels are continually elevated and hinder muscle development. Therefore, increased levels of creatine in the body aid the muscle building process by reducing cortisol induced muscle degradation.

Creatine becomes unstable under a variety of conditions. Particularly, creatine decomposes at 303°C, becomes anhydrous at 100°C, and converts to the cyclic form known as creatinine, which is useless to the muscles, in aqueous and acidic environments. Therefore, the processing restrictions on creatine have limited the range of edible products into which creatine may be incorporated.

Currently marketed creatine containing products include creatine powders, capsules, lozenges, and chews. Creatine powders are generally the crystalized monohydrate form of creatine, but have also been coupled with other substances to form compounds such as creatine citrate and creatine pyruvate in order to impart stability, and other properties.

Creatine powder is typically quite grainy having an average mesh size of about 100-200. The powder is most often mixed with a liquid and immediately consumed as a beverage. However, as alluded to above, creatine powder has been incorporated into a variety of other products such as lozenges and chews. Unfortunately, creatine has only limited solubility in water. Therefore, when administered in beverage form, much of an anticipated creatine dosage will remain as a solid in the beverage container, and not be consumed. Additionally, the solubility and grittiness of the creatine powder leaves lozenges and chews with a less than desired texture.

In addition to the above recited disadvantages, creatine has been difficult for the body to absorb. Problems with absorption arise both in the gastrointestinal tract, and in the muscle cells. This absorption resistance is attributed to many undesirable side effects, such as gastrointestinal discomfort, including cramping, bloating, and diarrhea.

In an effort to improve absorption and reduce side effects, creatine powder has been further processed into micronized creatine. The micronized creatine has an average particle size that is significantly smaller than traditional creatine powder, normally having a mesh size of above 200, preferably from about 250-400. While the micronized creatine has improved solubility, texture and absorption, the increased surface area of micronized creatine enhances its bitterness to the taste. The bitterness occurs while the creatine is present in the mouth, and also lingers as an after taste.

While micronized creatine is better absorbed through the gastrointestinal system than regular creatine powder, difficulties or disadvantages in absorbing both forms of creatine into the muscle cells still persists.

It is known that creatine is an insulin sensitive chemical. In short, when insulin blood levels are elevated, creatine passes more easily into the muscle cells for storage and use. Therefore, in order to maximize creatine absorption, creatine is advantageously administered simultaneously with a substance which will stimulate an increased insulin response, such as sugar.

Unfortunately, creatine will generally not survive the processing conditions required to concentrate amounts of sugar into various edible products. This is especially true when producing substances having a smooth elastic texture such as caramels and taffy.

In view of the foregoing, a creatine containing nutritional supplement which is prepared to enhance creatine absorption through the gastrointestinal tract and into the muscle cells is desirable.

Further, a creatine containing nutritional supplement which has a smooth texture and pleasant feel in the mouth is very desirable.

Additionally, a micronized creatine containing nutritional supplement which has no bitter taste or after taste is highly desirable.

Finally, a solid creatine containing nutritional supplement which is easily portable, requires no liquid for administration, and contains at least about 7% w/w of creatine at delivery is highly desirable.

OBJECTS AND SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a creatine containing nutritional supplement which enhances creatine absorption through the gastrointestinal tract and into the muscle cells.

Another object of the present invention is to provide a creatine containing nutritional supplement which has a smooth texture and pleasant feel in the mouth.

Yet another object of the invention is to provide a micronized creatine containing nutritional supplement which substantially reduces or eliminates any bitter taste or after taste.

A further object of the invention is to provide a solid, easily portable, simple to administer, creatine containing nutritional supplement which contains at least 7% w/w of creatine at delivery.

These objects, and others not specifically recited, may be realized in specific illustrative embodiments of a creatine containing caramel. Such a caramel contains a uniformly dispersed amount of creatine, and an amount of an invert sugar. Preferably the creatine is a micronized creatine having an average

particle size which is smaller than about 200 mesh. The smaller creatine particles minimize the grittiness of the caramel and provide a smooth and pleasant texture. The amount of invert sugar should be sufficient to reduce or eliminate any bitter taste imparted by the micronized creatine and preferably cause an enhanced insulin response.

As creatine is unstable at elevated temperatures, a heated caramel composition should be cooled to a temperature at which creatine is stable prior to introducing the creatine. Additionally, the mixture must be further agitated after the creatine addition in order to ensure a uniform creatine disbursement. Care must be taken however, to prevent the temperature of the caramel composition from dropping too low before introduction of the creatine. When the temperature is lowered, the caramel composition thickens, and if the caramel composition becomes too viscous, uniform creatine dispersion may not be attained.

Creatine dose efficiency is increased by co-administering micronized creatine with an insulin enhancing amount of sugar. Particularly, because of its small size, micronized creatine is more easily absorbed by both the gastrointestinal tract, and the body's muscle cells. Additionally, the presence of insulin further facilitates transport of creatine through the cell wall of the muscle cells. Therefore, the combination of micronized creatine and an insulin heightening amount of sugar provides a synergistic effect that increases creatine dosage efficiency.

A creatine dosage regimen for improving muscle performance and facilitating muscle growth may be used in order to achieve superior athletic performance. Such a dosage regimen includes administering a caramel containing an amount of creatine and an amount of an invert sugar to the body.

There has thus been outlined, rather broadly, the more important features of the invention so that the detailed description thereof that follows may be better understood, and so that the present contribution to the art may be better appreciated. Other features of the present invention will become clearer from the following detailed description of the invention, taken with the accompanying claims, or may be learned by the practice of the invention.

Detailed Description

Before the present creatine containing caramel is disclosed and described, it is to be understood that this invention is not limited to the particular process steps and materials disclosed herein, but is extended to equivalents thereof as would be recognized by those ordinarily skilled in the relevant arts. It should also be understood that terminology employed herein is used for the purpose of describing particular embodiments only and is not intended to be limiting.

It must be noted that, as used in this specification and the appended claims, the singular forms "a," and, "the" include plural referents unless the context clearly dictates otherwise. Thus, for example, reference to a caramel containing "a creatine component" includes one or more creatine components, reference to "a sugar" includes reference to one or more sugars, and reference to "the flavorant" includes reference to one or more flavorants.

In describing and claiming the present invention, the following terminology will be used in accordance with the definitions set forth below.

As used herein, "creatine" means any form of creatine including analogs, derivatives, acid addition salts, and creatine coupled compounds. Particularly, creatine monohydrate, anhydrous creatine, creatine citrate, and creatine pyruvate are included.

As used herein, "sugar" means any type of simple carbohydrate, such as a mono or disaccharide, either naturally obtained or artificially produced, which may act as a suitable sweetener in a caramel composition.

As used herein, "invert sugar" means an combination of two or more simple sugars which produces a greater sweetness than a single sugar and is preferably a mixture of fructose and D-glucose in substantially equal parts.

As used herein, "micronized" means any particle having a mesh screen size smaller than about 200 mesh.

As used herein, "caramel" means a smooth, chewy candy made with sugar, butter or other fats, cream or milk or milk solids, and flavoring.

As used herein, "effective amount," "sufficient amount," and the like means a minimum amount of an ingredient which, when included in a caramel

composition, achieves an intended effect. For example, a "sufficient amount" of invert sugar would be the minimum amount needed to reduce or eliminate a bitter taste caused by an amount of micronized creatine.

As used herein, "stable" means an ingredient which remains in a chemical form sufficient to perform its intended purpose.

This invention is drawn to the discovery that the muscle building and performance enhancing effects of elevated muscular creatine levels may be attained by administering creatine in a caramel containing an invert sugar. The creatine is preferably a micronized creatine having an average particle size which is smaller than about 200 mesh, and more preferably from about than about 250 to 400 mesh. The combination of micronized creatine and invert sugar presents several improvements in the texture and taste qualities of a creatine containing caramel, improves the amount and efficiency of creatine dosage which can be delivered using a caramel, and lowers the incidence of gastrointestinal upset due to creatine ingestion.

First, because of its solubility limitations, the addition of regular creatine, having a mesh size of about 100-200, to food products normally imparts a grainy texture. This grainy texture is most noticeable in smooth texture candies, such as caramel. The addition of an invert sugar to such a caramel, however, greatly improves the overall consistency of the caramel.

The texture of a creatine containing caramel may also be vastly improved by using micronized creatine, rather than regular creatine. Because micronized creatine has a much smaller particle size than regular creatine, the texture of a caramel containing micronized creatine is much smoother than the grainy caramel produced by regular creatine. When used in combination with an invert sugar, the smooth texture and creamy effect work synergistically to significantly improve the feel and dissolution of a caramel in the mouth.

The presence of an invert sugar in a caramel which uses micronized creatine is additionally important for another reason. As noted above, because of the vast surface area of micronized creatine, it imparts a bitter taste to the mouth. This bitter taste begins when the creatine enters the mouth, and persists after its

departure. Regular sugar and other flavorings have been found to be incapable of significantly reducing or eliminating this bitter taste and after taste. Only the enhanced sweetness of invert sugar has been shown capable of significantly reducing or eliminating the bitterness.

The capability of invert sugar to combat the bitter taste of micronized creatine is due to its particular nature. Invert sugar is generally a combination of the simple sugars dextrose (D-glucose) and fructose which provides a sweetness which exceeds that of a single sugar. In its more narrow and common definition, invert sugar is the product of the action of the enzyme *invertase* on sucrose to form a mixture of levulose (fructose) and D-glucose (dextrose). However, invert sugar, as defined herein, may be any combination of simple sugars which imparts a heightened sweetness. Preferably, the invert sugar used is that containing an equal parts mixture of D-glucose and fructose.

The timing of the sweetening effect of each of the invert sugar components is complimentary. This time variation in part explains the increased sweetness and reduction of bitterness. Particularly, the glucose, and fructose, as simple sugars, provide an initial burst of sweetness as the invert sugar enters the mouth. This quick sweetening masks the initial bitterness of micronized creatine. The sucrose and corn syrup solids used in making the caramel base, being either a disaccharide or starch hydrolysis product, provides a sustained sweetening power during chewing. Further, the fructose, while involved in the above two mentioned states, is also believed to provide a lingering sweetness which masks the bitter micronized creatine aftertaste.

In addition to creating a synergistic effect for improving the taste and texture of a creatine containing caramel, the combination of micronized creatine and an invert sugar also improves the efficiency of a creatine dose. As noted above, regular creatine experiences considerable difficulty in being absorbed by both the gastrointestinal tract, and the muscle cells. This lack of absorption causes a significant amount of a regular creatine dosage to be unused and eliminated from the body as waste. Additionally, the length of time which regular creatine resides in the digestive tract has been asserted as the cause of undesirable

gastrointestinal side effects such as upset stomach, cramping, bloating, and diarrhea.

The smaller particle size of micronized creatine facilitates creatine absorption by the digestive system, and also by the muscle cells. This increased absorption increases creatine dose efficiency, and reduces waste, as well as the undesirable gastrointestinal side effects. Additionally, it is now known that creatine is an insulin sensitive chemical. In short, cell absorption of creatine is enhanced by the presence of insulin.

Because creatine is an insulin sensitive chemical, the increased absorption of micronized creatine in the muscle cells may be further increased by co-delivering micronized creatine with an insulin enhancing amount of sugar. As such, caramel is a particularly well suited vehicle for administering creatine because of the amount of sugar which is necessarily present. The presence of an invert sugar only adds to the total amount of sugar in the caramel and increases the insulin response. Therefore, creatine dosage efficiency is optimized when micronized creatine is administered in a caramel which contains an invert sugar.

In addition to the improved texture and absorption advantages recited above, micronized creatine is desirable because a greater amount may be incorporated into a caramel. Particularly, the smaller sized particles reduce the amounts of interstical space between the creatine particles and the other ingredients of the caramel, and allow a greater percentage of creatine in the caramel.

The caramel composition of the present invention may be a preparation of any combination of ingredients which is known to those ordinarily skilled in the art of making caramel, and is not limited except by a requirement to contain an amount of creatine and an amount of an invert sugar. Particularly, in a preferred embodiment, the amount of creatine in the prepared caramel composition is from about 7 to about 17% w/w of the caramel composition. More preferably, the amount of creatine is about 10 to 14% and most preferably 12% of the prepared caramel composition.

While no limitation on the form of creatine used in the present invention is made, the preferred creatine form is creatine monohydrate. Further, the creatine is preferably micronized, having an average particle size smaller than 200 mesh, and most preferably from about 250 to about 400 mesh.

The amount of invert sugar contained in the prepared caramel composition of the present invention is preferably from about 1% to about 7% w/w of the caramel composition. More preferably, the amount of invert sugar is about 3 to 5% w/w of the caramel composition. These preferred amounts of invert sugar are in addition to the amount of table sugar (sucrose) or corn syrup solids required by the particular caramel recipe employed.

As defined above, a basic caramel formulation also contains butter or other fats, and either cream, milk, or milk products. The exact types and amounts of each is not essential to the present invention, and may vary depending on the desired characteristics of the final product. Such exact amounts and types may be readily determined by one ordinarily skilled in the art.

Other ingredients known to the applicant as useful for making a creatine containing caramel include but are not limited to: water, corn syrup, hydro soy oil, emulsifiers, lecithin, whey solids, sweetened condensed skim milk, flavorants, and vanillin. A combination utilizing these ingredients is set forth in the example below.

The method for making the creatine containing caramel of the present invention encompasses all methods for making caramel which are known to those ordinarily skilled in the art thereof, and is unlimited, other than to the conditions under which the creatine may be added. Particularly, the creatine must not be exposed to conditions which will cause it to become unfit for its intended purpose by changing forms, decomposing, etc. To this end, some restriction may be applied to the time of creatine addition, and the temperature to which it is subjected.

Therefore, in a preferred embodiment of the invention, the creatine is uniformly distributed throughout the caramel composition, and is added to a heated caramel composition after the composition has been cooled to a

temperature at which creatine is stable. More preferably, in order to achieve uniform distribution, and ensure creatine stability, the temperature will be from about 160°F to about 220°F, and most preferably, the temperature will be about 180°F. to about 200°F.

In order to achieve uniform distribution of the creatine, the caramel composition must be sufficiently agitated after adding the creatine. In a preferred embodiment, the caramel composition is continuously cooled and agitated after the addition of the creatine until the caramel composition is sufficiently solid that agitation is not practical. At this point the caramel is ready to be divided into individual pieces for packaging.

Because of the heating and stirring process under which most caramel compositions are prepared, the amount of ingredient added during processing will vary somewhat from the amount retained in the finally prepared caramel composition. This is mostly due to the evaporation of water out of the various components which yields a final composition having a greater percentage of some ingredients which are unaffected by the removal of water. Therefore, in order to achieve the preferred creatine amount in the prepared caramel composition enumerated above, creatine is added during processing in an amount of about 6% to about 16% w/w of the caramel composition. More preferably, the creatine amount added during processing is about 11% w/w of the caramel composition.

Additionally, in order to achieve the preferred amount of invert sugar enumerated above, invert sugar is added during processing in an amount of about 1% to about 9% w/w of the caramel composition. More preferably, the invert sugar amount added during processing is about 5% w/w of the caramel composition.

The flavors of the final caramel composition are unlimited. Any desired flavor may be imparted, as long as attaining the flavor would not render any essential ingredient unfit for its intended purpose. Flavors particularly preferred include but are not limited to: chocolate, strawberry, raspberry, orange, lemon, grape, apple, coffee, and toffee.

The example provided below is illustrative of only one embodiment of

making a creatine containing caramel of the present invention. While the processing conditions and ingredients may be preferred, no limitation thereto is to be inferred.

Example

To the pot of a standard sized gas fired Savage cooker with agitation, was added a blend of 5.12 lbs. of sugar, 14.85 lbs. of corn syrup (43DE), and 2.51 pounds of water. Agitation was begun at about 100 rpm, and heating of the mixture was commenced. During the heating and agitation, 3.65 lbs. of hyrdo soy oil(98F), 0.08 lbs. of lecithin, and 0.34 lbs. of an emulsifier were weighed into the pot. The temperature was increased during the addition of the ingredients until the temperature of the mixture was approximately 230°F.

Approximately 2.81 lbs. of whey solids were dissolved in about 8 lbs. water, and then 2.25 lbs. of invert sugar (levulose and D-glucose), and 6.16 lbs. of sweetened condensed skim milk were added to the whey and water to form a milk mixture. The milk mixture was added to the pot and heating continued until the combined mixture reached a temperature of approximately 235°F.

The mixture contained in the pot was cooled to 232°F while stirring continued, and 1.40 lbs. of cocoa liquor , 0.11 lbs. of vanillin, and 0.07 lbs. of butter flavoring were added. Mixing was continued, and the composition temperature was allowed to cool to about 200°F. Upon reaching the temperature of about 200°F, 4.70 lbs. of micronized creatine was added to the caramel composition. Mixing was continued, and the composition allowed to cool to a temperature of about 180°F.

Once a temperature of about 180°F was reached, the creatine containing caramel composition was removed from the pot and transferred to a cooling table. The composition was allowed to rest upon the cooling table until it reached a temperature of about 91°F, at which time the composition was cut and wrapped into individual pieces.

The above described process yielded a creatine containing caramel composition having the following components in the amounts specified:

Ingredient	% Amount of Composition	Ingredient	% Amount of Composition
Water	10	**Whey Solids**	6.93
Sucrose	12.76	**Sweetened Cond. Milk**	10.78
Corn Syrup	29.76	**Chocolate Flavor**	3.42
Hydro Soy Oil	10.78	**Vanillin**	0.27
Emulsifier	0.20	**Butter Flavor**	0.16
Lecithin	0.20	**Creatine**	11.72
Invert Sugar	4.04		

The creatine caramel composition having the components enumerated above showed excellent flavor, texture, and dissolution qualities in the mouth. Further, no gastrointestinal discomfort side effects were experienced by its consumers, who also reported superior muscle building and performance results.

It is to be understood that the above-described arrangements are only illustrative of the application of the principles of the present invention. Numerous modifications and alternative arrangements may be devised by those skilled in the art without departing from the spirit and scope of the present invention and the appended claims are intended to cover such modifications and arrangements. Thus, while the present invention has been described above with particularity and detail in connection with what is presently deemed to be the most practical and preferred embodiments of the invention, it will be apparent to those of ordinary skill in the art that numerous modifications. including, but not limited to, variations in size, materials, shape, form, function and manner of operation, assembly and use may be made without departing from the principles and concepts set forth herein.

Claims

What is claimed is:

1. A creatine containing caramel composition comprising a base containing an edible oil or fat, a sweetener comprising one or more mono and disaccharides and milk solids wherein said caramel has uniformly dispersed therein:

a) an effective amount of creatine; and

b) an effective amount of an invert sugar.

2. The caramel composition of claim 1, wherein the amount of creatine is from about 7 to about 17% w/w of the caramel composition.

3. The caramel composition of claim 2, wherein the amount of creatine is about 10 to 14% w/w of the caramel composition.

4. The caramel composition of claim 1, wherein the creatine is creatine monohydrate.

5. The caramel composition of claim 1, wherein the creatine has is a powder having an average particle size smaller than about 200 mesh.

6. The caramel composition of claim 5, wherein the creatine particle size is from about 200-400 mesh.

7. The caramel composition of claim 1, wherein the amount of invert sugar is from about 1% to about 7% w/w of the caramel composition

8. The caramel composition of claim 7, wherein the amount of invert sugar is about 3% to 5% w/w of the caramel composition.

9. The caramel of claim 1, wherein the invert sugar comprises a mixture of dextrose and fructose.

10. The caramel of claim 7, wherein the dextrose and the fructose are each present in an amount of about 50% w/w of the invert sugar.

11. A method of making a creatine containing caramel composition comprising the steps of:

a) preparing a caramel base containing an effective amount of an invert sugar in a conventional manner in a heated liquid caramel phase form;

b) partially cooling said heated liquid caramel phase to a temperature at which creatine is stable;

c) adding a desired amount of creatine to said partially cooled liquid caramel phase; and

d) agitating said partially cooled liquid caramel phase composition until the creatine is substantially uniformly dispersed therein; and

e) further cooling said partially cooled liquid caramel phase composition to a solid thereby resulting in said creatine containing caramel composition.

12. The method of claim 11, wherein the temperature of said partially cooled liquid caramel phase is between about 160°F to about 220°F at the time said creatine is added in step c).

13. The method of claim 12, wherein the temperature is from about 180 °F to 200°F.

14. The method of claim 11, wherein the amount of creatine is from about 6% to 16% w/w of the caramel composition.

15. The method of claim 14, wherein the amount of creatine is about 9% to 13% w/w of the caramel composition.

16. The method of claim 11, wherein the creatine is creatine monohydrate.

17. The method of claim 11, wherein the creatine is a powder having an average particle size smaller than about 200 mesh.

18. The method of claim 17, wherein the creatine particle size is from about 250 to 400 mesh.

19. The method of claim 11, further comprising the step of: dividing creating containing caramel composition into individual serving size portions.

20. A method of increasing the efficiency of a creatine dose comprising the steps of:

a) uniformly distributing an amount of creatine having an average particle size of less than about 200 mesh into a caramel composition containing an insulin enhancing amount of an invert sugar; and

b) administering the caramel composition to a human.

21. The method of claim 20, wherein the creatine is creatine monohydrate.

22. The method of claim 20, wherein the average creatine particle size is from about 250 to 400 mesh.

23. The method of claim 20, wherein the amount of creatine is from about 6% to about 16% w/w of the caramel composition.

24. The method of claim 23, wherein the amount of creatine is about 9% to about 13% w/w of the caramel composition.

25. The caramel composition of claim 20, wherein the amount of invert sugar is from about 1% to about 7% w/w of the caramel composition

26. The caramel composition of claim 25, wherein the amount of invert sugar is about 3% to 5% w/w of the caramel composition.

27. The caramel of claim 20, wherein the dextrose and the fructose are each present in an amount of about 50% w/w of the invert sugar.

28. A method of reducing or eliminating a bitter taste caused by micronized creatine comprising the step of:

a) uniformly distributing the creatine into a caramel composition containing a sufficient amount of invert sugar to reduce or eliminate any bitter taste caused by the micronized creatine.

29. The method of claim 28, wherein the amount of micronized creatine is from about 6% to 16% w/w of the caramel composition.

30. The method of claim 29, wherein the amount of micronized creatine is about 9% to 13% w/w of the caramel composition.

31. The method of claim 28, wherein the amount of invert sugar is from about 1% to 9% w/w of the caramel composition.

32. The method of claim 31, wherein the amount of invert sugar is about 5% w/w of the caramel composition.

33. The method of claim 28, wherein the invert sugar comprises a mixture of dextrose and fructose.

34. The method of claim 33, wherein the dextrose and fructose are each present in an amount of about 50% w/w of the invert sugar.

35. A method of facilitating muscle building and improving muscle performance comprising the step of:

a) administering to the body, a caramel comprising:

1) an amount of creatine; and

2) an amount of invert sugar.

36. The method of claim 35, wherein the amount of creatine in the caramel is from about 7% to about 17% w/w of the caramel composition.

37. The method of claim 36, wherein the amount of creatine in the caramel is about 10% to 14% w/w of the caramel composition.

38. The method of claim 35, wherein the creatine is creatine monohydrate.

39. The method of claim 35, wherein the creatine has is a powder having an average particle size smaller than about 200 mesh.

40. The method of claim 39, wherein the creatine particle size is From about 250 to 400 mesh.

41. The method of claim 35, wherein the amount of invert sugar is from about 1% to about 7% w/w of the caramel composition

42. The method of claim 41, wherein the amount of invert sugar is about 3% to 5% w/w of the caramel composition.

43. The method of claim 35, wherein the invert sugar comprises a mixture of dextrose and fructose.

44. The method of claim 43, wherein the dextrose and the fructose are each present in an amount of about 50% w/w of the invert sugar.

INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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US CL :514/23, 564, 565
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 514/23, 564, 565

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CAS ONLINE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5,612,375 A (SUEOKA) 18 March 1997 (18/03/97), see entire document, especially column 1, lines 9-34.	1-44
A	US 5,908,864 A (CASEY) 01 June 1999 (01/06/99), see entire document, especially column 1, lines 38-64.	1-44

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search
11 JUNE 2001

Date of mailing of the international search report
13 JUL 2001

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